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50 CFR Part 17

RIN 1018-AB75

Endangered and Threatened Wildlife and Plants; Proposal To Determine Endangered Status for Four Fairy Shrimp and the Vernal Pool Tadpole Shrimp in California

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) proposes to determine endangered status pursuant to the Endangered Species Act of 1973, as amended (Act) for five animals: The vernal pool fairy shrimp (*Branchinecta lynchi*), Conservancy fairy shrimp (*Brancinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), California linderiella (*Linderiella* occidentalis), and the vernal pool tadpole schrimp (*Lepidurus packardi*). These five invertebrate species are restricted to vernal pools and swales in the State of California and are imperiled by habitat loss and modification. This proposal, if made final, would implement protection and recovery provisions provided by the Act for all of these animals. Critical habitat is not proposed. The Service seeks data and comments from the public on this proposal.

DATES: Comments from all interested parties must be received by July 7, 1992. Public hearing requests must be received by June 22, 1992.

ADDRESSES: Comments and materials concerning this proposal should be sent to the Sacramento Field Office, U.S. Fish and Wildlife Service, 2800 Cottage Way Room E-1823, Sacramento, California 95825-1846. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Chirstopher D. Nagano at the above address or by telephone (916/978-4866 or FTS 4760-4866).

SUPPLEMENTARY INFORMATION:

Background

The Conservancy fairy shrimp, longharn fairy shrimp, vernal pool fairy shrimp, and California linderiella are aquatic members of the Crustacean order Anostraca. The vernal pool tadpole shrimp is an acquatic member of the Crustacean order Nostraca. They are endemic to vernal pools and swales in the Central Valley, Coast Ranges, and a limited number of sites in the Transverse Range and Santa Rosa Plateau of California.

The four fairy shrimp and the vernal pool tadpole shrimp live in ephemeral freshwater habitats, such as vernal pools and swales. None are known to occur in running or marine waters or other permanent bodies of water. They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of water, and other environmental factors that include specific pH levels, salinity, temperature, and quantities of dissolved oxygen. Water chemistry is one of the most important factors in determining the distribution of fairy shrimp (Belk 1977). The five species proposed for listing herein have been found to be extremely sporadic in their distribution since they may inhabit only one or a few pools in otherwise more widespread vernal pool complexes (Larry Eng, California Department of Fish and Game, pers. comm., 1990).

Fairy shrimp have delicate elongate bodies, large stalked compound eyes, no carapace, and 11 pairs of swimming legs. They swim or glide gracefully upside down by means of complex beating movements of the legs that pass in a wave-like anterior to posterior direction. Nearly all fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus (Pennak 1989). The second pair of antennae in the adult females are cylindrical and elongate, but in the males are greatly enlarged and specialized for clasping the females during copulation. The females carry the eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the bottom or remain attached until the female dies and sinks. The thick-shelled "resting" or "winter" eggs are capable of withstanding high heat, cold, and prolonged dessication. The eggs hatch when the vernal pools and swales fill with rainwater. The early stages of the fairy shrimp develop rapidly into adults.

Tadpole shrimp have dorsal compound eyes, a large shield-like carapace that covers most of the body, and a pair of long cercopods at the end of the last abdominal segment (Pennak 1989; Linder 1952; Longhurst 1955; Lynch 1966, 1972). They are primarily benthic animals that swim with their legs down. Tapole shrimp climb or scramble over objects, as well as plow along or in bottom sediments. Food items consist of organic detritus and living organisms that they capture, such as fairy shrimp and other invertebrates (Pennak 1989; Fryer 1988). Mating in tadpole shrimp is described by Longhurst (1955). The females deposit their eggs on vegetation

and other objects on the pool bottom. The vernal pool tadpole shrimp passes the dry months in the egg stage. The eggs hatch as the vernal pools and swales are filled with rainwater in the fall and winter.

Vernal pools form in regions with Mediterranean climates where shallow depressions fill with water during fall and winter rains and then evaporate in the spring (Holland and Jain 1977, 1988; Thorne 1984). Overbank flooding from intermittent streams may augment the amount of water in some vernal pools (Hanes *et al.* 1990). Downward percolation is prevented by the presence of an impervious subsurface layer, such as a clay bed, hardpan, or volcanic stratum (Holland 1976, 1988). In well developed vernal pools, temporary inundation makes pools too wet for nearby upland plant species during the wetted period, while rapid drying during late spring makes pool basins unsuitable for marsh or aquatic species that require a more permanent source of water. However, many indigenous plant and several aquatic invertebrate species have evolved to occupy the arduous environmental conditions found in vernal pool habitats. Fairy shrimp and tadpole shrimp play an important role in the community ecology of ephemeral water bodies (Loring *et al.* 1988). They are fed upon by waterfowl (Krapu 1974, Swanson *et al.* 1974) and other vertebrates, such as spadefoot toad (*Scaphious hammondi*) tadpoles (Marie Simovich, University of San Diego, pers. comm., 1991).

Vernal pools occur in several regions of California. Generally vernal pool habitat is found west of the Sierra Nevada and extends from southern Oregon into northern Baja California, Mexico (Holland and Jain 1977, 1988). The distribution of vernal pools is highly discontinuous and some of the aquatic invertebrates that are found in this habitat occur only in specific geographic areas.

Urban development, and water, flood control, highway, and utility projects, as well as conversion of wildlands to agricultural use, endanger vernal pools in southern California (Riverside and San Diego Counties), the Central Valley, and San Francisco Bay area (Jones and Stokes Associates 1987). Changes in hydrologic pattern, grazing, and off-road vehicle use also endanger these sites and the five species proposed for listing herein. There were an estimated six million acres of vernal pools in the Central Valley at the time Europeans arrived in California (Holland 1978). By 1970, Holland (1978, 1988) estimated that 90 percent of this amount was destroyed largely by human activities. Vernal pools in southern California have been highly impacted by human activities (Zedler 1987). The rate of loss of vernal pool habitat in California continues at approximately 2 or 3 percent per year (Holland 1988).

A Discussion of the Five Species

The Conservancy fairy shrimp (*Branchinecta conservatio*), in the family Branchinectidae, was described by Larry Eng *et al.* in 1990, from specimens collected at the Jepson Prairie Preserve, which is located in the Central Valley east of Travis Air Force Base in Solano County (Eng *et al.* 1990). The animal ranges in size from 14 to 27 millimeters (0.6 to 1.1 inches) long. This species is most similar in appearance to *B. lindahli* (Lindahl's fairy shrimp). However, the female brood pouch is fusiform and usually ends under abdominal segment 8 in *B. conservatio*, where it is cylindrical and usually ends under segment 4 in *B. lindahli*. The large, oval pulvillus at the proximal end of the basal segment of the male antennae appears similar in both species; however, the terminal end of the distal segments are distinctive (Eng *et al.* 1990).

The Conservancy fairy shrimp inhabits highly turbid, ephemeral water located in swales and vernal pools. The species is known from four disjunct localities: seven pools in the Vina Plains north of Chico in Tehema County; three pools on the Jepson Prairie in Solano County; one pool near Haystack Mountain northeast of Merced in Merced County (Eng *et al.* in 1990); and one pool in the Lockewood Valley of northern Ventura County (Michael Fugate, University of California at Riverside, pers. comm., 1991). The pools inhabited by the Conservancy fairy shrimp are large, such as the 36 hectare (89 acre). Olcott Lake at Jepson Prairie (Eng., pers. comm., 1990). The Conservancy fairy shrimp has been observed from November to early April. The pools at Jepson Prairie and Vina Plains inhabited by this animal have a neutral pH, and very low conductivity, total dissolved solids (TDS), and alkalinity (Barclay and Knight 1984; Eng *et al.* 1990).

The longhorn fairy shrimp (*Branchinecta longiantenna*), family Branchinectidae, was described by Larry Eng *et al.* in 1990 from specimens collected at Souza Ranch in the Kellogg Creek watershed, about 35 kilometers (22 miles) southeast of the City of Concord in Contra Costa County, California (Eng *et al.* 1990). It ranges in size from 12.1 to 20.8 mm (0.5 to 0.8 in). This species differs from other branchinectids because the portion of the distal segment of its antennae is flattened in the anterod-posterior plane rather than the latero-medial plane. The species inhabits ephemeral water that is located in clear to turbid grass-bottomed pools in unplowed grasslands and also clear-water pools in sandstone depressions. This species is known only from three disjunct localities along the eastern margin of the central Coastal Range from Concord, Contra Costa County, south to Soda Lake in San Luis Obispo County: 4 pools in the Kellogg Creek watershed; 1 pool at the Atlamount Pass area; and 13 pools around the western and northern boundaries of Soda Lake on the Carrizo Plain (Eng *et al.* 1990). All pools inhabited by this species are filled by winter and spring rains and may last until June. The longhorn fairy shrimp has been observed from late December until late April. The water in grassland pools inhabited by this species has a neutral pH, and very low conductivity, TDS, and alkalinity (Eng *et al.* 1990).

The vernal pool fairly shrimp (*Branchinecta lynchi*), family Branchinectidae, was described by Larry Eng *et al.*, 1990, from specimens collected at Souza Ranch in the Kellogg Creek watershed, Contra Costa County, California (Eng *et al.* 1990). The common name "vernal pool fairy shrimp" is utilized by the Service instead of the "vernal pool branchinecta" that was originally given to this species in Eng *et al.* (1990). "Fairy shrimp" is a widely recognized common name for other members of the genus *Branchinecta*. The vernal pool fairy shrimp ranges in size from 10.9 to 25.0 mm (0.4 to 1.0 in). This species most resembles *B. coloradensis* (Colorado fairy shrimp). There are several differences in the antennae of the males of the two species including the basal segment outgrowth below and posterior to the pulvillus which is ridge-like in *B. lynchi*, whereas it is cylindrical and often much larger in *B. coloradensis*. The shorter brood pouch of *B. lynchi* is pyriform while the larger one in *B. coloradensis* is fusiform (Eng *et al.* 1990).

The vernal pool fairy shrimp inhabits ephemeral pools with clear to tea-colored water. This species has been most commonly observed in grass or mud bottomed swales, earth sump, or basalt flow depression pools in unplowed grasslands. The vernal pool fairy shrimp has been collected from early December to early May. The water in pools inhabited by this species has a pH averaging 7.0; and low TDS, conductivity, alkalinity, and chloride (Collie and Lathrop 1976). The vernal

pool fairy shrimp is found at 30 vernal pools and swales from the Vina Plains in Tehama County through most of the length of the Central Valley, and south along the central Coast Range to the mountain grassland of northern Santa Barbara County (Eng *et al.* 1990; Mike Fugate, pers. comm., 1991). Several disjunct populations also occur on the Santa Rosa Plateau and near Rancho California in Riverside County. Although the vernal pool fairy shrimp is found at a number of sites, it is not abundant at any of them. It often occurs with other fairy shrimp species, but is never the numerically dominant one (Eng *et al.* 1990).

The California linderiella (*Linderiella occidentalis*), family Linderiellidae, was described by G.S. Dodds in 1923, from specimens collected at Stanford University in Santa Clara County, California (Eng *et al.* 1990). This is the only member of the fairy shrimp family Linderiellidae in North America (Pennak 1989). *Linderiella occidentalis* has horn-like, conical shaped antennal appendages with short median spines. The frontal appendage is absent or not longer than Antenna II (Belk 1975).

The California linderiella inhabits ephemeral pools containing clear to tea-colored water. These pools are most commonly located in grass bottomed swales of unplowed grasslands in old alluvial soils underlain by hardpan, or in clear-water pools formed in sandstone depressions. Some specimens have been observed in mud-bottomed pools containing lightly turbid water. All pools known to be inhabited by this species are filled by winter and spring rains and may last until June. The pools vary in size from 1 square meter (10.8 square feet) to the 40-hectare (99-acre) Boggs Lake in Lake County. The California linderiella has been observed from late October to early May. The water in pools inhabited by this species has very low alkalinity, conductivity, and TDS (Eng *et al.* 1990). The California linderiella is found at 40 vernal pools and swales in the Central Valley from east of Red Bluff in Tehama County to east of Madera in Madera County and across the valley in the Sacramento area to the central and south coast mountains from Boggs Lake in Lake County south to Riverside County (Eng *et al.* 1990; Mike Fugate, pers. comm., 1991).

The vernal pool tadpole shrimp (*Lepidurus packardi*) is a member of the family Triopsidae and was described by Eugene Simon in 1886 (Longhurst 1955). Longhurst (1955) placed the name in synonomy with *Lepiduras apus*. Susequently, Lynch (1972) examined the taxa and determined that *Lepiduras packardi* is a valid species. The Service accepts Lynch's taxonomic treatment of the genus *Lepiduras*, thus maintaining the integrity of *L. packardi*.

Vernal pool tadpole shrimp adults reach a length of 50 mm (2 in). They have about 35 pairs of legs, two long cercopods, and a flat, paddle-shaped supra-anal plate. The animal inhabits vernal pools and swales containing clear to highly turbid water. The vernal pool tadpole shrimp is found at 14 vernal pool complexes in the Sacramento Valley from the Vina Plains in Butte County south of the Sacramento area in Sacramento County and west to the Jepson Prairie region of Salano County. The pools inhabited by the vernal pool tadpole shrimp range in size from 5 square meters (16.4 square ft) in the Mather Air Force Base area of Sacramento County to the 36 hectare (89 acre) Olcott Lake at Jepson Prairie. The pools at Jepson Prairie and Vina Plains have a neutral pH, and very low conductivity, TDS, and alkalinity (Barclay and Knight 1984; Eng *et al.* 1990). These pools are most commonly located in grass bottomed swales of unplowed grasslands in old alluvial soils underlain by hardpan, or in mud-bottomed pools containing highly turbid water. All pools known to be inhabited by this species are filled by winter and spring rains and may last until June.

Previous Federal Action

Ms. Roxanne Bittman petitioned the Service to list the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and California linderiella as endangered species in a letter dated November 19, 1990, which was received by the Service on November 20, 1990. Ms. Bittman submitted additional information on these species in a letter dated November 20, 1990, which was received on November 26, 1990. On March 21, 1991, the Service determined in the 90-day finding that the petition contained substantial information indicating that the action requested may be warranted. A notice announcing this finding was published in the **Federal Register** on August 30, 1991 (56 FR 426968). Ms. Dee Warenycia petitioned the Service to list the vernal pool tadpole shrimp as an endangered species in a letter dated April 28, 1991, which was received by the Service on April 30, 1991. On November 21, 1991, the Service determined in the administrative 90-day finding that the petition contained substantial information that the action requested may be warranted. This proposal to list the four fairy shrimp and the vernal pool tadpole shrimp is based on available scientific and commercial information, various scientific papers and unpublished reports, and constitutes the 1-year finding for the two petitioned actions.

Summary of Factors Affecting the Species

Section 4 of the Endangered Species Act (16 U.S.C. 1533) and regulations promulgated to implement the listing provisions of the Act (50 CFR part 424) set forth the procedures for adding species to the Federal Lists. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool fairy shrimp (*Branchinecta lynchi*), California linderiella (*Linderiella occidentalis*), and the vernal pool tadpole shrimp (*Lepidurus packardi*) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of Their Habitat or Range

Vernal pools and other ephemeral bodies of water inhabited by these animals are imperiled by a variety of human-caused activities; primarily urban development, water supply/flood control activities, and conversion of land to agricultural use. Habitat loss occurs from direct destruction and modification of pools from filling, grading, discing, leveling, and other activities. Vernal pools also are indirectly affected by modifications of surrounding uplands that alter the vernal pool watershed.

Rapid urbanization of areas containing vernal pools poses a significant threat to the five species proposed for listing herein. In the Sacramento area, at least four pool complexes that contained suitable habitat for the vernal pool fairy shrimp, California linderiella, and the vernal pool tadpole shrimp were eliminated by urban development in the late 1980's. Mitigation measures were either lacking or unsuccessful. However, mitigation measures requires for loss of vernal pool plants at these locations may not benefit the fairy shrimps. In general, the growth rate of human populations and associated urban development throughout the Central Valley is equal to or exceeds that of any other region in California. Indicative of this growth rate are proposals to develop several new towns within the ranges of the vernal pool fairy shrimp, California linderiella and the vernal pool tadpole shrimp. As an example, two towns proposed to be

located in Placer and San Joaquin Counties would contain 60,000 and 44,000 people, respectively, and would likely impact significant amounts of vernal pool habitat for these species (Wiegand 1991).

In the Laguna Creek-Elk Grove region of the Sacramento Valley, residential development projects pose a severe threat to vernal pool complexes that are believed to be inhabited by the vernal pool fairy shrimp, California linderiella, and vernal pool tadpole shrimp populations. These proposed and ongoing projects, sponsored by private interests and local governments, include, but are not limited to modifications to Strawberry, Elk Grove, and Laguna Creeks; Elk Grove Boulevard-Interstate 5 interchange; and at least seven housing developments in this area (Cay Goude, U.S. Fish and Wildlife Service, pers. comm., 1990).

Proposed projects elsewhere in the Sacramento and San Joaquin Valleys that could adversely affect populations of the fairy shrimp and vernal pool tadpole shrimp include the closure of Mather Air Force Base (if the area is proposed for development after closure), at least three urban development projects, several proposed surface mines, and the Merced County Streams project (Cay Goude and Monty Knudsen, U.S. Fish and Wildlife Service, pers. comm., 1990).

The Service has received information that vernal pools located in the Sacramento area that are likely to have provided habitat for the California linderiella, vernal pool fairy shrimp, and the vernal pool tadpole shrimp have been filled without authorization from the U.S. Army Corps of Engineers (Corps) (Tricia Richards, Sacramento County Planning and Community Development, *in litt,* June 26, 1991). Another site in Stanislaus County that potentially may have contained 150 acres of vernal pool habitat for the vernal pool fairy shrimp and the California linderiella was converted to irrigated pasture sometime in 1990 (Martha Naley, Fish and Wildlife Service, pers. comm., 1991).

In other areas of the State, significant vernal pools, such as at Skunk Hollow in Riverside County, that contain the California linderiella and the vernal pool fairy shrimp are likely to be eliminated by urban development and possibly agricultural conversion (Art Davenport, Fish and Wildlife Service, pers. comm., 1990). In San Luis Obispo County, most of the known sites for the longhorn fairy shrimp and vernal pool fairy shrimp are located in areas subdivided and roaded for sale and development (Eng *et al.* 1990). To date, some of the sites have been cleared, and continued habitat loss is likely in the foreseeable future.

Because of rapid urbanization, several highway projects are proposed that may affect the vernal pool fairy shrimp, California linderiella, and the vernal pool tadpole shrimp. The California linderiella, which has been recorded from vernal pools in the Lincoln area of Placer County, is threatened by the construction of the proposed State Highway 65 Lincoln by-pass (Cay Goude, Fish and Wildlife Service, pers. comm., 1990). Vernal pools in the Sacramento area that are inhabited by the vernal pool fairy shrimp, California linderiella, and the vernal pool tadpole shrimp could be adversely affected by the proposed widening of State Highway 16. The State of California has proposed to extend State Highway 505 from Vacaville to Collinsville in Solano County. This project could directly and indirectly impact vernal pools inhabited by the Conservancy fairy shrimp and the vernal pool tadpole shrimp (Cay Goude, pers. comm., 1990).

Agricultural conversion poses a widespread threat to remaining vernal pools in the Central Valley. Sites containing the vernal pool fairy shrimp near Pixley in Tulare County and Haystack Mountain are privately-owned habitat remnants surrounded by agricultural operations (Eng *et al.* 1990). In recent months, two sites with significant vernal pools in the Sacramento Valley that likely contained the California linderiella, vernal pool fairy shrimp, and the vernal pool tadpole shrimp were plowed or disced and seeded with winter wheat (Cay Goude, Fish and Wildlife Service, pers. comm., 1990). Discing and other farming or ranching practices, including heavy grazing are agricultural practices employed in vernal pools and swales. Many of these activities are exempt from regulation under section 404 of the Clean Water Act (U.S. Environmental Protection Agency and U.S. Department of the Army 1990), and therefore may not require a permit from the Army Corps of Engineers.

Water-storage projects proposed for the Kellogg Creek watershed in eastern Contra Costa County could greatly reduce or eliminate a vernal pool complex that supports the highest diversity of fairy shrimp in the State (California Department of Fish and Game 1983). The rock pools in this area are inhabited by the vernal pool fairy shrimp, longhorn fairy shrimp and California linderiella. The proposed Los Vaqueros and Kellogg Reservoirs could impact substantial portions of this watershed (Jones and Stokes Associates 1986, 1989, 1990).

Proposed utility projects at several sites may affect all of the fairy shrimp and the vernal pool tadpole shrimp proposed for listing herein. Proposed construction of high-pressure natural gas and petroleum pipelines, and three 230,000 volt electric transmission lines at the Los Vaqueros and Kellogg Reservoir sites could adversely affect the vernal pool fairy shrimp, longhorn fairy shrimp, and California linderiella (Contra Costa Water District and U.S. Bureau of Reclamation 1991, Jones and Stokes Associates 1991). A proposed natural gas pipeline project along the west side of the Sacramento Valley south through Solano County could impact habitat of the Conservancy fairy shrimp, vernal pool fairy shrimp, California linderiella, and the vernal pool tadpole shrimp (Federal Energy Regulatory Commission 1991, Arnold 1990).

Off-road vehicle (ORV) use also imperils fairy shrimp and the vernal pool tadpole shrimp inhabiting vernal pools (Bauder 1986, 1987). ORVs cut deep ruts, compact soil, destroy native vegetation, and alter pool hydrology. Fire fighting, security patrols, military maneuvers, and recreational activities have cumulatively damaged vernal pool habitats in many areas (Bauder 1986, 1987). In Solano County, a proposed off-road recreational park adjacent to the Jepson Prairie Reserve owned by The Nature Conservancy could adversely impact populations of the Conservancy fairy shrimp and the vernal pool tadpole shrimp at Olcott Lake.

Other secondary impacts associated with urbanization include disposal of waste materials into habitat for the five species proposed for listing herein (Bauder 1986, 1987). Disposal of concrete, tires, refrigerators, sofas, and other trash adversely affects these animals by eliminating habitat, disrupting pool hydrology or, in some cases, through release of toxic substances. Dumping of garbage, including motor oil and household chemicals, may have changed the water chemistry of the vernal pools in Isla Vista in Santa Barbara County resulting in the extirpation of the California linderiella at that site (Simovich undated). Dust and other forms of air or water pollution from commercial development or agriculture projects also may be deleterious to these animals.

Human activities that alter the watershed of vernal pools may indirectly affect the fairy shrimp and the vernal pool tadpole shrimp. Many of the plants and several of the aquatic

invertebrates that occur in vernal pools are dependent upon specific hydrologic patterns that occur during wet winters followed by spring and summer drying. The flora and fauna in vernal pools or swales can change if the hydrologic regime is altered (Bauder 1986, 1987). Activities that reduce the extent of the watershed or that alter runoff patterns (i.e., amounts and seasonal distribution) may eliminate the animals, reduce their population sizes or reproductive success, or shift the location of sites inhibited by these animals.

Vernal pool watershed areas have been reduced by conservation of uplands to paved or grass-turf surfaces, road damming, or other construction activities. Physical barriers, such as roads and canals, may deepen a vernal pool upstream of a barrier and can isolate a fairy shrimp or vernal pool tadpole shrimp population from a portion of its aquatic habitat. Surface runoff, including nonpoint runoff, is altered by disturbance from trenching, grading, scraping, off-road vehicles, intensive livestock grazing, or other activities that change amounts, patterns, and direction of surface runoff to ephemeral drainages. Presence of summer water also affects the hydrologic pattern. Introduction of water during the summer disrupts the life cycles of the fairy shrimp and the vernal pool tadpole shrimp by subjecting them to greater levels of predation by animals requiring more permanent sources of water. Increased water also converts vernal pools to unsuitable marsh habitat dominated by emergent vegetation (e.g., cattails).

B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes

Not known to be applicable.

C. Disease or Predation

Not known to be applicable.

D. The Inadequacy of Existing Regulatory Mechanisms

The primary cause of the decline of these species is loss of habitat from human activities. State and local laws and regulations have not been passed to protect the five species proposed for listing herein. Other regulatory mechanisms necessary for the conservation of vernal pools have proven inadequate and ineffective.

The State environmental review process under the California Environmental Quality Act for projects that result in loss of sites that support these animals sometimes requires development of mitigation plans. However, the effectiveness of this statute in protecting vernal pool habitat has not been consistent. As documented above, fairy shrimp and vernal pool tadpole shrimp habitat has been eliminated without offsetting mitigation measures. Furthermore, mitigation plans that have been required were designed specifically for vernal pool plants. No plans to date have included provisions for any of the four fairy shrimp species or the vernal pool tadpole shrimp. The artificial creation of vernal pools as mitigation habitat is highly experimental (Ferren and Gevirtz 1990, Zedler and Black 1988). Their effectiveness for the species proposed herein for listing is unknown. Vernal pools are intricate ecosystems and efforts to recreate them may not be successful until they are more fully understood (Ferren and Gevirtz 1990).

Under section 404 of the Clean Water Act, the Corps regulates the discharge of fill material into waters of the United States, which include navigable waters, wetlands (e.g., vernal pools), and certain other waters. The Clean Water Act requires potential applicants to notify the Corps prior to undertaking any activity (grading, discharge of soil or other fill material, etc.) that would result in fill of wetlands. Nationwide Permit 26 has been issued to regulate fill of wetlands of less than 10 acres. Under Nationwide Permit 26, most proposals that involve fill of wetlands smaller than 1 acre are considered permitted. Where fill would occur in a wetland between 1 and 10 acres, the Corps circulates for comment a predischarge notification to the Service and other interested parties to determine whether or not the proposed fill activity and associated impacts warrant a full public notice.

Individual Corps permits are required for discharge of fill material into wetlands greater than 10 acres. The review process for issuance of individual permits is more intensive. Unlike nationwide permits, an analysis of cumulative wetland impacts is required for individual permit applications. Resulting permits typically include special conditions that avoid or mitigate environmental impacts. The Corps has discretionary authority and can require an applicant to seek an individual permit if the Corps believes that resources are sufficiently important, regardless of the wetland's size. In practice, however, the Corps generally does not require an individual permit when a project qualifies for a nationwide permit, unless a threatened or endangered species or other significant resources are known to occur on the site.

Most vernal pools and swales within the range of these four species of fairy shrimp and the vernal pool tadpole shrimp encompass less than 10 acres. The discontinuous distribution of these sites has allowed some landowners to divide several large projects into several smaller projects. Wetland acreage on these smaller projects is usually under 10 acres, and, therefore, most projects qualify for Nationwide Permit 26. The discontinuous configuration of the pools and swales further obscures separation of these wetland losses.

The Sacramento District of the Corps has several thousand vernal pools under its jurisdiction (Coe 1988), including most of the geographic range encompassing the species proposed for listing herein. Areas occupied by these animals are undergoing rapid urbanization and current trends indicate 60 to 70 percent of these pools could be destroyed in the next 10 to 20 years (Coe 1988). From January to October 1990, the Corps issued at least 52 Nationwide 26 permits that accounted for the loss of at least 57 acres of vernal pools in the Central Valley area (Marilynn Friley, Fish and Wildlife Service, per. comm., 1990). An acre of jurisdictional vernal pool wetlands is part of a much larger seasonal watershed not regulated by the Corps.

The Conservancy fairy shrimp, vernal pool fairy shrimp, California linderiella, and the vernal pool tadpole shrimp are found in vernal pools at the Vina Plains in Tehama County. They likely co-inhabit pools that also support *Limnanthes floccosa* subsp. *californica* (Butte County meadowfoam). This plant was proposed for listing as an endangered species on February 15, 1991 (56 FR 6345). these Crustaceans could be indirectly protected by actions taken to conserve the Butte County meadowfoam. A "conservation plan" has been drafted for the City of Chico (Jokerst 1989) that details various actions designed to conserve the plant, such as creation of a preserve system. However, the draft plan does not address plant populations and vernal pool habitat outside City limits. Moreover, the City of Chico has yet to adopt the plan. Meanwhile, as in other vernal pool areas, the Corps has issued nationwide permits for numerous residential developments in the Chico area.

The Nature Conservancy (Conservancy) owns or controls vernal pool habitat at a number of locations, including Jepson Prairie in Solano County, Vina Plains in Tehama County, the Carrizo Plain in San Luis Obispo County, and Santa Rosa Plateau area in Riverside County. All four fairy shrimp species and the vernal pool tadpole

shrimp are represented on Conservancy property. Management plans for Conservancy properties include provisions to protect vernal pools, but do not specifically address these species. Surrounding privately-owned vernal pool habitat is not protected.

E. Other Natural or Man-made Factors Affecting Their Continued Existence

The areas supporting the fairy shrimp species and the vernal pool tadpole shrimp are usually small, and unforeseen natural and human-caused catastrophic events could cause the elimination of some sites. The five Crustaceans may be vulnerable to random fluctuations or variation (stochasticity) due to annual weather patterns, availability of food, and other environmental factors. Most of the populations of the five species are isolated from other conspecific populations and are distributed in discontinuous vernal pool systems. Such populations are vulnerable to stochastic extinction.

The Service has carefully assessed the best scientific and commercial information regarding past, present, and future threats faced by these species in determining to propose this rule. As described in more detail under Factors A, D, and E, available information indicates that the vernal pool fairy shrimp, Conservancy fairy shrimp, longhorn fairy shrimp, California linderiella, and the vernal pool tadpole shrimp may warrant, listing pursuant to section 4(a)(1) of the Act. The four fairy shrimp and the vernal pool tadpole shrimp are imperiled by rapid urbanization, conversion of land to agricultural use, off-road vehicle use, and changes in hydrologic patterns in areas they occupy. Only a small proportion of the pools are permanently protected from these threats. Stochastic events, which commonly affect small isolated populations, also may result in extirpation of some populations of these species. The majority of the populations of the species proposed for listing herein are located in or near regions undergoing urbanization, and relatively few are found in protected areas. Based on this evaluation, the preferred action is to propose to list the vernal pool fairy shrimp (*Branchinecta lynchi*), Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), California linderiella (*Linderiella occidentalis*), and the vernal pool tadpole shrimp (*Lepidurus packardi*) as endangered. For reasons discussed below, the Service is not proposing to designate critical habitat for these animal species at this time.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat concurrently with determining a species to be endangered or threatened. The Service finds that the designation of critical habitat is not prudent for these species at this time. A number of sites inhabited by the species proposed for listing herein occur on private land that is undergoing rapid urban and agricultural development. Some areas reportedly have been destroyed to eliminate vernal pool characteristics and escape regulatory jurisdiction by the Corps. Because vernal pool habitats are small and easily identified, publication of precise maps and descriptions of critical habitat in the **Federal Register** would make these species more vulnerable to incidents of vandalism. Affected agencies and principal landowners have been notified concerning management requirements of these animals. Protection of the habitat of these species will be addressed through the recovery process and through the section 7 consultation process. Federal involvement in areas where these animals occur can be identified without designation of critical habitat. Therefore, the Service finds that designation of critical habitat for these animals is not prudent at this time, because such designation likely would increase the degree of threat from vandalism or other human activities.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires recovery actions be carried out for all listed species. Such actions are initiated following listing. The protection required to Federal agencies and the prohibitions against taking are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered on threatened. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a proposed species. If a species is subsequently listed, section 7(a)(2) requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the response Federal agency must enter from formal consultation with the Service.

As described above, the U.S. Army Corps of Engineers exerts section 404 jurisdiction over habitats supporting these animals. Nationwide permits are not issued where a federally listed endangered or threatened species would be affected by the proposed project. When listed species may be affected, formal consultation is carried our pursuant to section 7 of the Act. In addition, the Department of Housing and Urban Development (HUD) may insure housing loans in areas that presently support these animals; HUD actions regarding these loans also would be subject to review by the Service under section 7 of the Act.

Other Federal agencies that possibly could be affected if these animals are listed would include the U.S. Department of Agriculture (Farmers Home Administration), Veterans Administration, and the Department of Transportation (Federal Highways Administration). Populations of the longhorn fairly shrimp and California linderiella occur on property owned by the Bureau of Land Management at the Carrizo Plain in San Luis Obispo County and the National Park Service at Point Reyes National Seashore in Marin County.

The listing of these fairy shrimp and the vernal pool tadpole shrimp also would bring sections 5 and 6 of the Endangered Species Act into effect. Section 5 authorizes acquisition of lands for the purposes of conserving endangered and threatened species. Pursuant to section 6, the Service would be able to grant funds to affected states for management actions aiding in protection and recovery of these animals.

Listing these fairy shrimp and the vernal pool tadpole shrimp as endangered would provide for development of a recovery plan (or plans) for them. Such plan(s) would bring together both State and Federal efforts for conservation of the animals. The plan(s) would establish a

framework for agencies to coordinate activities and cooperate with each other in conservation efforts. The plan(s) would set recovery priorities and estimate costs of various tasks necessary to accomplish them. They also would described site-specific management actions necessary to achieve conservation and survival of the fairy shrimp and the vernal pool tadpole shrimp.

The Act and implementing regulations found at 50 CFR 17.21 for endangered species set forth a series of prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any such species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that was illegally taken. Certain exceptions can apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered animal species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, to alleviate economic hardship in certain circumstances, and/or for incidental take in connection with otherwise lawful activities. Further information regarding regulations and requirements for permits may be obtained from the U.S. Fish and Wildlife Service, Office of Management Authority, 4401 North Fairfax Drive, room 432, Arlington, Virginia 22203–3507 (703/358–2104 or FTS 921–2093).

Public Comments Solicited

The Service intends that any final action resulting from this proposal be as accurate and effective as possible in the conservation of endangered or threatened species. Therefore any comments or suggestions for the public, other concerned government agencies, the scientific community, industry, private interests, or any other interested party concerning any aspect of this proposal are hereby solicited. Comments particularly are sought concerning:

(1) Biological, commercial, or other relevant data concerning any threat (or the lack thereof) to these fairy shrimp or the vernal pool tadpole shrimp;

(2) The location of any additional populations of the Conservancy fairy shrimp, vernal pool fairy shrimp, longhorn fairy shrimp, California linderiella, or the vernal pool tadpole shrimp and the reasons that any habitat should or should not be determined to be critical habitat as provided by section 4 of the Act;

(3) Additional information concerning the range and distribution of these fairy shrimp and the vernal pool tadpole shrimp; and

(4) Current or planned activities in the subject areas that may impact these fairy shrimp and the vernal pool tadpole shrimp;

Any final decision on the proposal will take into consideration the comments and any additional information received by the Service, and such communications may lead to the adoption of a final regulation that differs from this proposal.

The Endangered Species Act provides for a public hearing on this proposal, if requested. Requests must be filed within 45 days of the date of the proposal. Such requests must be made in writing to the Sacramento Field Office (see **ADDRESSES** section).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defend under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein is available upon request from the Field Supervisor, Sacramento, California Field Office (see ADDRESSES section).

Author

The primary author of this proposed rule is Christopher D. Nagano, staff entomologist, Sacramento Field Office, 2800 Cottage Way, Room E-1823, Sacramento, California 95825 (916/978–4866 or FTS 460–4866).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Proposed Regulation Promulgation

PART 17—[AMENDED]

Accordingly, it is hereby proposed to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations as set forth below:

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500, unless otherwise noted.

2. It is proposed to amend § 17.11(h) by adding the following in alphabetical order under CRUSTACEANS, to the Lists of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*	*	
CRUSTACEANS							
Linderiella, California	*Linderiella occidentalis*	U.S.A. (CA)	NA	E		NA	NA
*	*	*	*	*	*	*	
Shrimp, Conservancy fairy	*Branchinecta conservatio*	U.S.A. (CA)	NA	E		NA	NA
*	*	*	*	*	*	*	
Shrimp, longhorn fairy	*Branchinecta longiantenna*	U.S.A. (CA)	NA	E		NA	NA
*	*	*	*	*	*	*	
Shrimp, vernal pool fairy	*Branchinecta lynchi*	U.S.A. (CA)	NA	E		NA	NA
*	*	*	*	*	*	*	
Shrimp, vernal pool tadpol	*Lepidurus packardi*	U.S.A. (CA)	NA	E		NA	NA
*	*	*	*	*	*	*	

Dated: April 22, 1992.

Richard N. Smith,

Acting Director, U.S. Fish and Wildlife Service.

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